NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance study purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY
TOWN OF MONONGAH, MARION COUNTY, WEST VIRGINIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Monongah, Marion County, West Virginia, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by the U. S. Geological Survey (USGS) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-85-E-1823. This work was completed in September 1986.

1.3 Coordination

On January 17, 1985, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives from FEMA, the town, and the USGS (the study contractor) to determine the streams to be studied by detailed methods. The Pittsburgh District of the U. S. Army Corps of Engineers (COE) and the Soil Conservation Service (SCS) were contacted for information pertinent to this study.

On April 7, 1987, a final CCO meeting was held with representatives from FEMA, the town, and the study contractor to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Monongah, Marion County, West Virginia. The area of study is shown on the Vicinity Map (Figure 1).

The West Fork River was studied by detailed methods for its entire length within the community. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through September 1991.

Booths Creek was studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Town of Monongah.

2.2 Community Description

The Town of Monongah is located in the southern portion of Marion County, approximately 4.5 miles south of Fairmont, in northern West Virginia. It is completely surrounded by the unincorporated areas of Marion County. The total land area contained within the corporate limits is approximately 0.51 square mile. In 1980, the population of the town was 1,132 (References 1 and 2).

The West Fork River flows in a generally northern direction. It has a drainage area of 815 square miles, of which 102 square miles is regulated by the Stonewall Jackson reservoir. The average gradient of the West Fork River within the town is 2.4 feet per mile. Local relief above the stream valley varies from a low of 851 feet to an average hilltop elevation of 1,200 feet. Monongah has an approximate elevation of 873 feet (Reference 2).

The climate of Marion County is temperate with a seasonal variation in temperature. The town is located in a region termed humid continental: humid because of the evenly spaced precipitation and continental because of the yearly range in temperature. Precipitation is distributed fairly evenly throughout the year. Mean annual precipitation over the community is approximately 43 inches. The average annual temperature is 55 degrees Fahrenheit ($^{\circ}$F), with an average maximum temperature of 80 to 88°F in July and an average minimum temperature of 20 to 26°F in February (Reference 3).

2.3 Principal Flood Problems

The main flood season in the area is during the period from March through September. Most floods occurring during this period are the

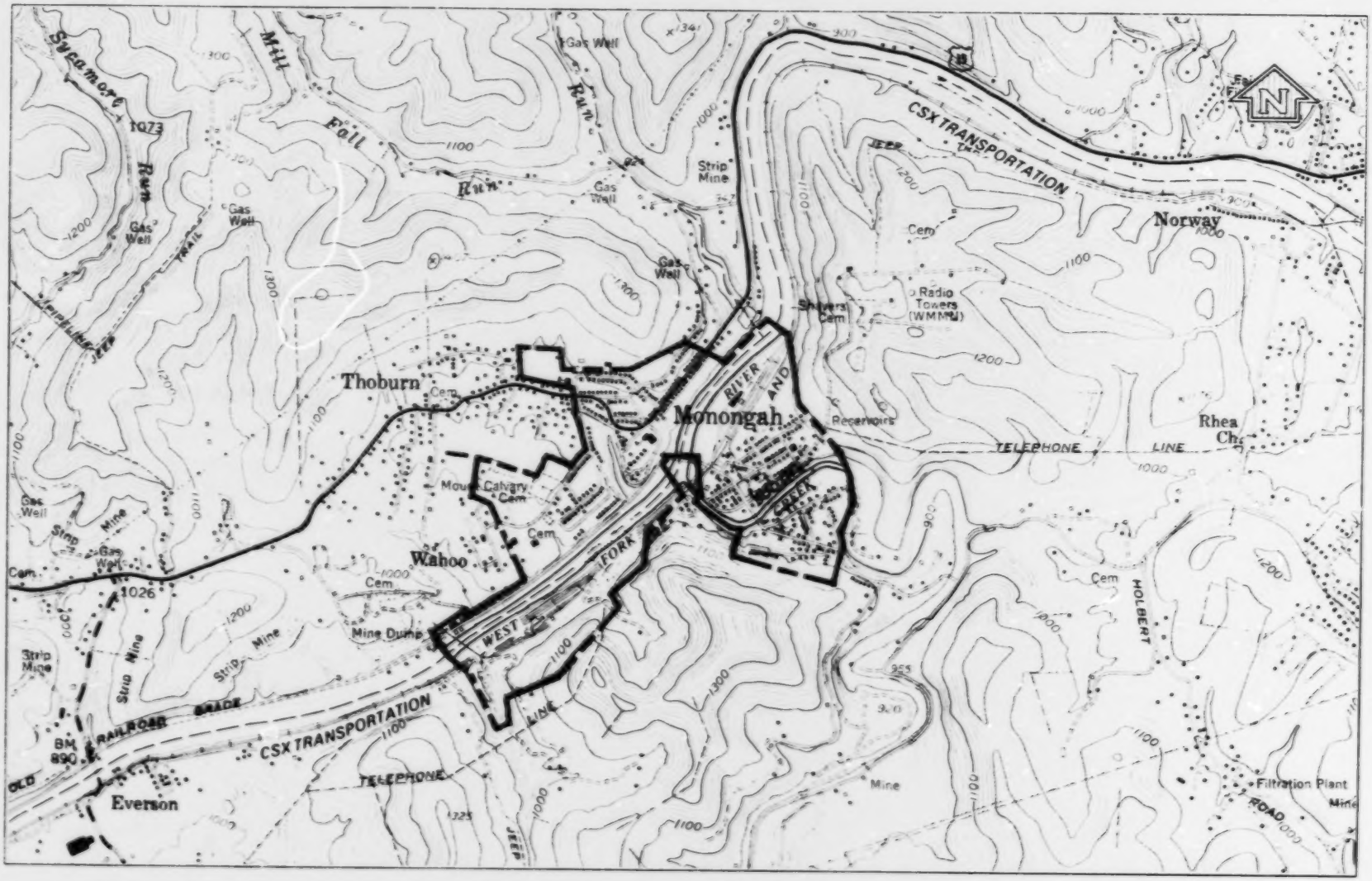

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF MONONGAH, WV

(MARION CO.)

APPROXIMATE SCALE

2000 0 2000 4000 6000 FEET

VICINITY MAP

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result of large frontal storms or decaying tropical storms that pass through the area. Major floods have occurred in the area in 1967 and 1985.

2.4 Flood Protection Measures

There are no local flood protection measures within the Town of Monongah at the present time. However, a COE reservoir on the West Fork River significantly reduces flooding in the town. The Stonewall Jackson Dam, which is under construction but considered operational, is located on the West Fork River near Brownsville. It controls 102 square miles of drainage area. This reservoir is operated to control flooding along with other uses such as recreation and low-flow augmentation.

3.0 ENGINEERING METHODS

For the flooding source studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. A flood event of a magnitude which is expected to be equaled or exceeded once on the average during any 100-year period (recurrence interval) has been selected as having special significance for floodplain management and for flood insurance rates. This event, commonly termed the 100-year flood, has a 1 percent chance of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for the flooding source studied in detail affecting the community.

The modified 100-year discharge for the West Fork River used to develop profiles in this study was determined by the Pittsburgh District of the COE and reflects the regulation as expected by Stonewall Jackson reservoir located at river mile 71 (Reference 4).

A summary of the drainage area-peak stage relationships and the drainage area-peak discharge relationships for the West Fork River is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK STAGE 100-YEAR (feet)	PEAK DISCHARGES 100-YEAR (cfs)
WEST FORK RIVER			
At downstream corporate limits	873	885	56,000
At upstream corporate limits	828	883	52,000

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the source studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the backwater analysis for the West Fork River were developed by field survey. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and the Flood Insurance Rate Map (Exhibit 2) where applicable.

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE modified 100-year profile and USGS step-backwater program E431 within the corporate limits (Reference 5). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100-year floodplain boundaries to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. For the stream studied in detail, the 100-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 20 feet (Reference 6).

For the stream studied by approximate methods, the 100-year flood boundary was delineated using topographic maps and engineering judgment (Reference 6).

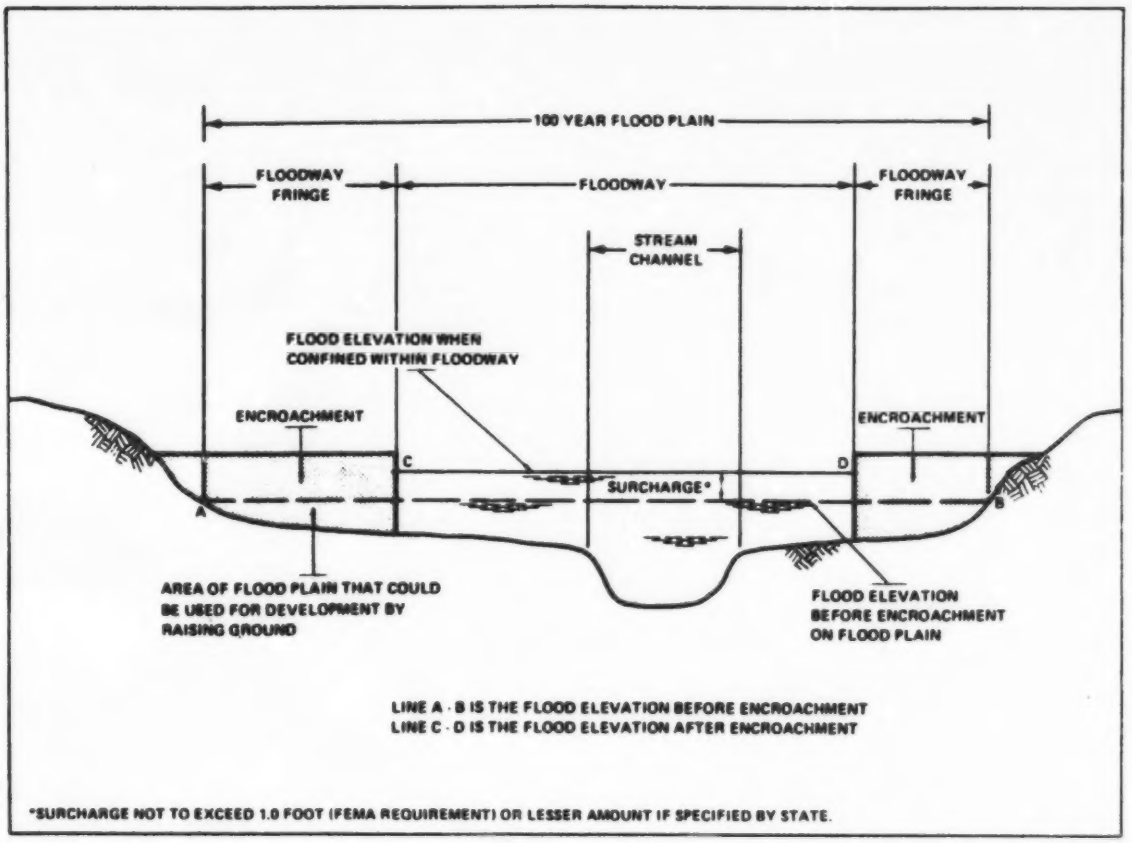
The 100-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

No floodways were calculated as part of this study.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
A
B
SURCHARGE*
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC Figure 2

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approxi-mate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

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Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year

Zone X - continued

floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100-year floodplain. The locations of selected cross sections used in the hydraulic analyses are shown where applicable.

7.0 OTHER STUDIES

This study is in agreement with the modified 100-year profile as developed by the Pittsburgh District of the COE for controlled discharges along the West Fork River caused by the operation of the Stonewall Jackson reservoir.

A Flood Insurance Study for the unincorporated areas of Marion County is currently being prepared (Reference 7). The results of that study will be in agreement with the results of this study.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

9.0 BIBLIOGRAPHY AND REFERENCES

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4. U. S. Department of the Interior, Geological Survey, in cooperation with the West Virginia Department of Highways, Runoff Studies on Small Drainage Areas by G. S. Runner, Washington, D. C., 1980.

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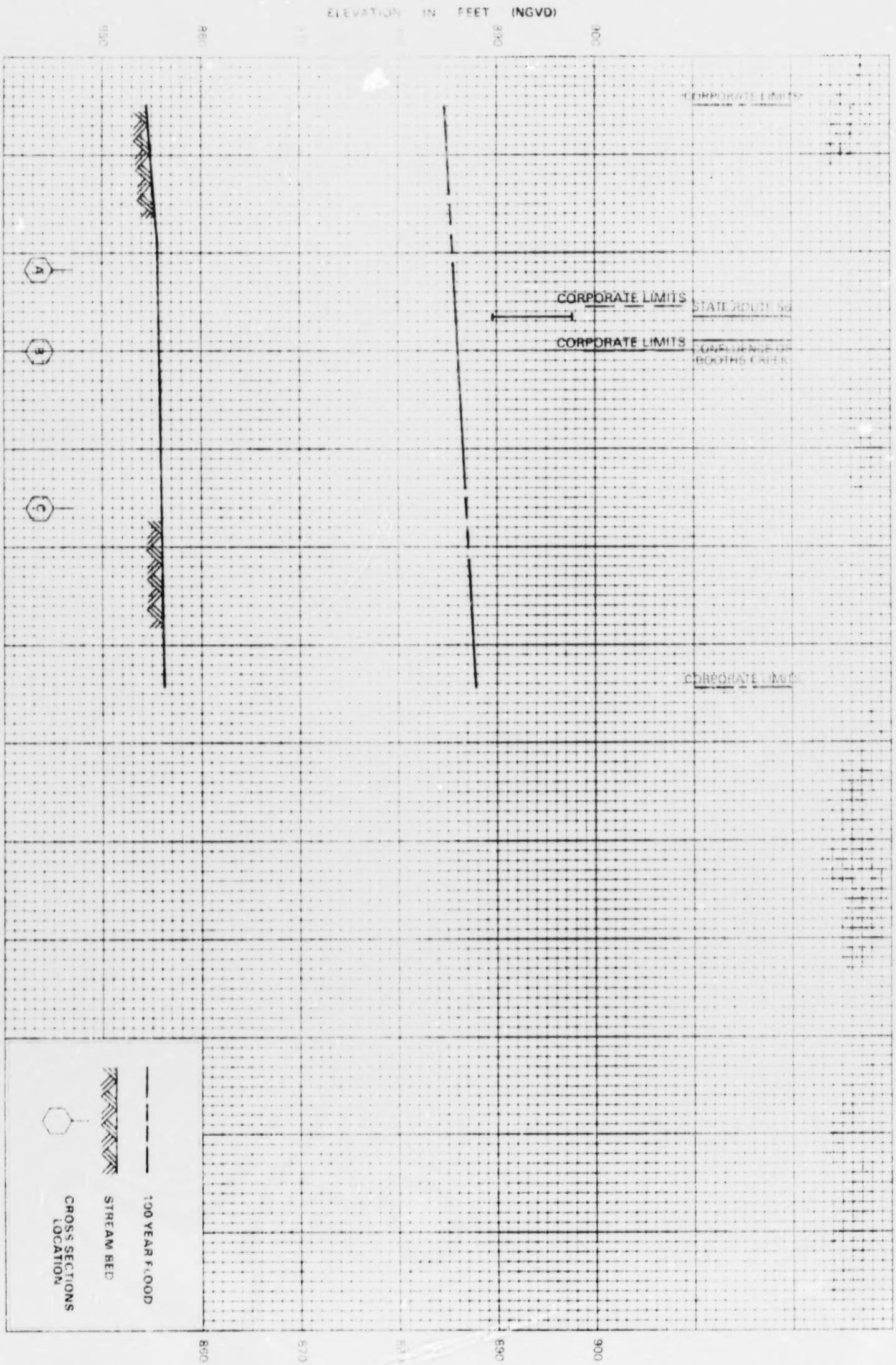
6. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 20 Feet: Fairmont West, West Virginia, 1958, Photorevised 1976.

7. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Marion County, West Virginia (Unpublished).

U. S. Department of the Interior, Geological Survey, Office of Water Data Collection, Interagency Advisory Committee on Water Data, "Guidelines for Determining Flood Flow Frequency," Bulletin 17B, Reston, Virginia, Revised September 1981.

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	Elevation (Feet NGVD)	Description of Location
RM 1	895.308	Bench mark, USGS gaging station work tablet on right downstream wing wall of West Virginia Secondary Route #56 bridge over the West Fork River.
RM 2	895.22	COE, Pittsburgh office; chiseled square on top of left upstream wing wall at end of West Virginia Secondary Route #56 bridge over West Fork River.



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01P	FEDERAL EMERGENCY MANAGEMENT AGENCY TOWN OF MONONGAH, WV (MARION CO.)	FLOOD PROFILES WEST FORK RIVER